Remarks

Claim 14 is amended to eliminate the premature use of "said."

The Official Action rejects all of the claims by applying the Yoshida reference as the primary reference. Therefore the applicability of the Yoshida reference will be addressed here before addressing the individual rejections.

The undersigned finds no reference at all in Yoshida to the printing being applied as modified by a screen. The word "screen" does not appear in Yoshida, nor the words "continuous tone" or "contone." The rejections states that Yoshida prints with a screen, but the citations to Yoshita for that are to descriptions of printing one line over another line. The final pattern shown is suggestive of a rectangle (Fig. 5 of Yoshita).

The rejections further states that use of a halftone screen is inherent in applying data to a printhead. This is not acknowledged, and some teaching or authority is respectfully requested.

Even assuming some screen is used or inherent in Yoshita, it surely is not the screen described and claimed in this application. As the claims expressly state, the screen is a halftone screen. As stated at page 8, lines 14 to 21 of the specification, halftoning involves allowing for shade variations by turning off only a certain percentage of pells.

Halftoning has a wide number of variations, and the modern screen typically is conceptual pattern, not physical hardware. United States Patent No. 4,556,918 to Yamazake et al. (copy enclosed) is a teaching of one type of embodiment, as well as having introductory teachings of other variations. This patent clearly illustrates generating screened halftone images (although the embodiment is for saving memory. which is presumably unimportant today in view of advances in electronics).

Each minute cell in a picture region in the foregoing patent 4,556,918 is given a predetermined number. Those numbers vary from large to small in a predetermined pattern. Those numbers are compared to the number in image data from the same picture area. Image data corresponding to each cell is given a density number. If the image density number is larger than the corresponding cell number, that area of image data is printed. This results in predetermined patterns of printed elements which vary with the intensity of the overall region being depicted by the printing.

Examples of the halftone dot pattern obtained are shown in Figures 5A and 5B of the patent. See column 6, lines 57-65. The patterns for a video [density] signal having a value of 68 of a possible high of 255 is shown in Figure 5A. Figure 5A shows two somewhat irregular solid areas spaced diagonally from one another. The pattern for a video [density] signal having a value of 240 of a possible high of 255 is shown in Figure 5B. Figure 5B shows a large solid square with two, small somewhat irregular white areas spaced diagonally from one another.

Thus, even assuming that Yoshida teaches or suggests a screen, nothing suggests such a screen is as specialized as a halftone screen.

Correcting the skew of a printhead does not necessarily involve a halftone screen. Where the printing is not to have shades of gray or shades of color, a halftone screen is simply not involved. Yoshida only suggests printing solid colors, not shades of colors.

The only explicit statement in Yoshida as to what is being printed is a statement indicating that yellow printing and magenta printing are to be in similar patterns, which of course, yields solid colors, not shades of colors, unless the pattern is that of a halftone. The Yoshida statement is found at column 2, lines 65 to 67, which read: "The white circles on the paper represent dots printed by the preceding yellow head 43." Followed at col. 3, lines 4 to 5

which read: "The magenta image consists of similar image lines." These statements are about Fig. 5, which suggests a rectangle of dots, not a halftone pattern.

Finally, even if Yoshida included halftoning, which it does not, it certainly does not address reducing artifacts resulting from halftoning. Yoshida is only about deskewing. This specification apparently has complete novelty to teaching when and how to use halftone screening to reduce undesirable print artifacts.

Claims 1, 4, 9 and 14 are rejected as anticipated by Yoshida. Since all of these claims have an express halftone screen limitation, the foregoing discussion fully responds to this rejection.

Claims 2, 5-6, 15, and 17-19 are rejected as obvious over Yoshida in view of the Cullen reference and in view of the Kamitani reference. Yoshida is cited for correcting skew in image data. Cullen is cited for associating text characters with blocks and correcting skew by shifting separate blocks. Kamitani is cited for identifying text characters which adjoin each other and associating each character with a respective portion.

As discussed fully in the foregoing with respect to Yoshida, Yoshida does not teach halftone screening. Accordingly, claims 2, 5, 15 and 17-18 are fully distinguished on that basis.

In addition, such application of Cullen cannot stand because Cullen does not preserve individual characters. As shown in Figure 2c of Cullen and stated at column 5, lines 6 -21, the scanned document is first compressed. The compression of Cullen is the logical OR result of neighboring data in which a single black in the OR operation renders the result black (col. 6, line 40 – col. 7, line 13). Figure 3 of Cullen is illustrative. Black in any pel location in lines 300-303 produces black, as shown in 312. Similarly, in Figure 5 of Cullen, lines 501 and 502

create rectangle 530, which is bounded only when the data in both lines are white. Rectangle 522 is defined by black 515 only in line 502.

It is such rectangles that Cullen rotates to correct skew. Accordingly, Cullen does not preserve text at all during skew correction. Cullen is about defining blocks of text and blocks of images as an aid to subsequent character recognition. The rectangles deskewed by Cullen do not contain actual text and certainly are not about finding characters which bridge adjacent blocks.

In discussing skew Cullen states: "In any event, each rectangle is the boundary of a set of connecting patterns (pixels) that form a word or a letter." (col. 13, lines 31-33). Thus, Cullen does not suggest locating characters which bridge adjoining blocks for purposes of correcting skew. The rejection applies the Kamitani reference for identifying adjoining text characters and associating each character with a respective portion. However, Kamitani does not associate characters to anything at all similar to blocks since Kamitani is about segmenting [separating] characters. The parts of Kamitani cited in the Official Action say nothing about associating the segment characters.

With respect to claim 6, Yoshida is cited in the Official Action as teaching continuous tone data. Column 2, lines 17-19 of Yoshida are cited for the teaching continuous tone data. However, these lines do not specify continuous tone data. They simply say "data" and data can be data for solid color, not data for shades of color.

In summary, the reliance on Cullen in this rejection of claims 2, 5-6, 15 and 17-19 is not supported as all of the claims require an identification ofcharacters that bridge adjoining blocks, while the Kamitani teaching of segmenting characters could not cure this deficiency. In addition, reliance on Yoshida with respect to claim 6 as teachingcontinuous tone data is not supported as discussed in the foregoing.

Claims 11-12 are rejected as obvious over Yoshida in view of Cullen and the Saund reference. Yoshida is cited for correcting skew in continuous tone data. Cullen is cited for identifying text characters and correcting skew by shifting individual blocks. Saund is cited for de-warping image data, which is applied as teaching for characters bridging a block boundary, shifting a minority portion of the text character located in an adjacent block not present in the associated block by an amount corresponding to a difference between a skew correction factor corresponding to the associated block and a skew correction factor corresponding to the adjacent block.

As discussed with respect to claim 6, Yoshida is cited in the Official Action as teaching continuous tone data. Column 2, lines 17-19 of Yoshida are cited for the teaching continuous tone data. However, these lines do not specify continuous tone data. They simply say "data" and data can be data for solid color, not data for shades of color.

This rejection also cites column 14, lines 51-57 of Cullen for inherent skew correction if a text character bridges a block boundary. In response, however, it is respectfully submitted that column 14, lines 51-57 in no way discuss rotation of part of a rectangle, and the rectangles of Cullen do not bridge characters. More fundamentally, independent rotation of two blocks which bridge a character would seem to describe the problem this invention solves, not the solution of this invention.

The rejection finds with respect to Cullen that the use of a vertical centerline instead of a rectangle is old and well known. However, as discussed fully in the foregoing, Cullen does not identify any text which bridges adjoining blocks. Accordingly, it could not suggest finding the centerline of such text.

Finally, Saund is cited for shifting a minority portion of each text character. In response, however, Saund is about reading text from a bound document. It employs

information of the document shape to de-warp. This does not at all suggest deskewing by associating a text character with an image block as claimed.

With respect to claim 12, Yoshida is cited for applying a halftone screen. As discussed fully in the foregoing with respect Yoshida, Yoshida does not teach a halftone screen.

The desirability is not recognized in any of the references of deskewing a character partially in one deskew block based on the deskew factor of another block so that a character is not distorted by being partly deskewed in one amount and partly deskewed in another amount.

Accordingly, reconsideration is respectfully requested, followed by allowance of claims 1, 2, 4-6, 9, 11, 12, and 14-19, all of the pending claims.

Respectfully submitted,
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